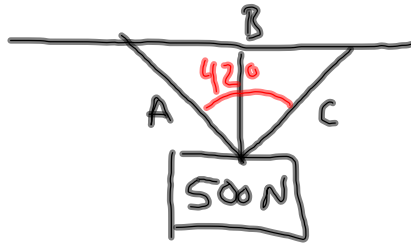
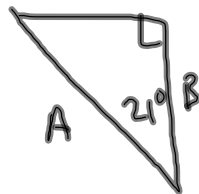


Hanging Object and Ramp Practice Problems 3.28.12 CP Physics

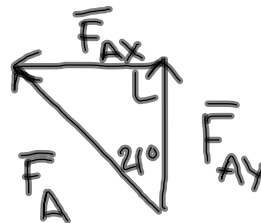
A sign is hung by three ropes as seen in the figure below. The angle between ropes A and C is 42.0 degrees, and line B bisects the angle. Find the force on ropes A and B.



y-components of each rope is
equal to $\frac{500\text{ N}}{3} = 166.7\text{ N}$



this triangle is just
to show angle



Force triangle from
rope A

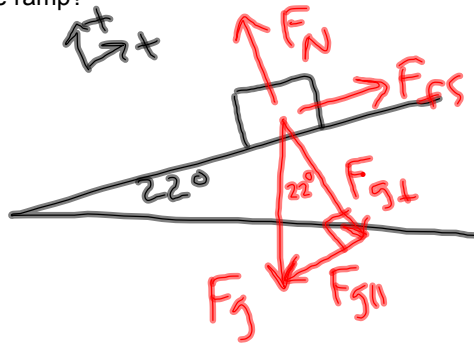
$$F_{Ay} = 166.7\text{ N}$$

$$\cos(21^\circ) = \frac{F_{Ay}}{F_A}$$

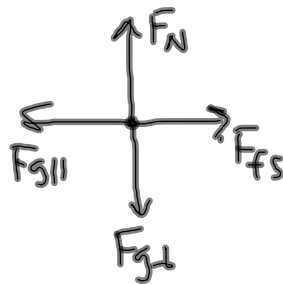
$$\begin{aligned} F_A &= \frac{F_{Ay}}{\cos(21^\circ)} \\ &= \frac{166.7\text{ N}}{\cos(21^\circ)} \\ &= 178.6\text{ N} \end{aligned}$$

Hanging Object and Ramp Practice Problems 3.28.12 CP Physics

A 5.5 kg suitcase is at rest on a ramp that is angled 22.0 degrees above the horizontal. What is the coefficient of friction between the suitcase and the surface of the ramp?



equilibrium in
parallel and
perpendicular
directions



$$\begin{aligned} \mu_s &= \frac{F_{fs}}{F_N} \\ &= \frac{20.19 \text{ N}}{49.98 \text{ N}} \\ &= 0.404 \end{aligned}$$

$$\sum F_{||} = 0$$

$$F_{fs} - F_{g||} = 0$$

$$F_{fs} = F_{g||}$$

$$= F_g \sin(22^\circ)$$

$$= m a_g \sin(22^\circ)$$

$$= 20.19 \text{ N}$$

$$\sum \bar{F}_\perp = 0$$

$$F_N - F_{g\perp} = 0$$

$$F_N = F_{g\perp}$$

$$= m a_g \cos(22^\circ)$$

$$= 49.98 \text{ N}$$